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On the spider genus *Amaurobius* (Araneae, Amaurobiidae) in India and Nepal

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Abstract

A new species, *Amaurobius koponeni* **sp. n.**, is described from Himachal Pradesh on the basis of a male specimen. A key to all five genera of Amaurobiidae that occur in Asia is provided. Four species from India and Nepal incorrectly assigned to *Amaurobius* are transferred to three genera of Titanoecidae: *Anuvinda milloti* (Hubert, 1973), **comb. n.**, *Pandava andhraca* (Patel & Reddy, 1990), **comb. n.**, *P. nathabhaii* (Patel & Patel, 1975), **comb. n.**, and *Titanoeca sharmai* (Bastawade, 2008), **comb. n.**

Keywords

Amaurobiidae, Titanoecidae, India, Asia, key, new combination

Introduction

Amaurobius C.L. Koch, 1837, is a rather large genus with 68 valid species names (Platnick 2011). It has a primarily Holarctic distribution. Only six species of this genus have been recorded outside of this region: *A. andhracus* Patel & Reddy, 1990, *A. nathabhaii*

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Patel & Patel, 1975, *A. sharmai* Bastawade, 2008 (all in India), *A. thoracicus* Mello-Leitão, 1945 (Argentina), *A. tristis* L. Koch, 1875 (Eritrea) and *A. yanoianus* Nakatsudi, 1943 (Micronesia). Only the first two of these are known from both sexes. The other species are known either from female or by juvenile (*A. thoracicus*) specimens and appear to have been incorrectly assigned to the genus and even possibly to the family.

Recently, we found a specimen belonging to *Amaurobius* from northern India and whilst trying to identified it, we checked all species (descriptions) known from India and Nepal. The study of these descriptions revealed that all the so-called amaurobiid species were misplaced and actually belong to Titanoecidae, and at least *Amaurobius sharmai* is likely to belong to *Titanoeca* Thorell, 1870. Another *Amaurobius, A. milloti* Hubert, 1973, known from Nepal also seems to have been misplaced and belongs to the titanoecid genus *Anuvinda* Lehtinen, 1967.

The aims of this paper are to describe a new species of *Amaurobius,* to provide a key to the amaurobiid genera that occur in Asia, and to transfer the misplaced species to Titanoecidae.

Material and methods

Microphotographs were made with an Olympus Camedia E-520 camera attached to an Olympus SZX16 stereomicroscope at the Zoological Museum, University of Turku. Digital images were montaged using "CombineZP" image stacking software. Photographs were taken in paraffin-based dishes using different sized holes to keep the samples in the required position. The holotype of the new species is preserved in the collections of the Museo Civico di Storia Naturale di Verona, Italy (MSNV). Comparative specimens illustrated are from Russia, Kunashir Island (*Cybaeopsis* and *Callobius*) and Magadan Area (*Arctobius*) and from Finland (female of *Amaurobius fenestralis*).

All measurements are in millimetres.

Taxonomic survey

To date, five genera of amaurobiid spiders have been recorded from Asia east of the Caucasus: *Amaurobius* C.L. Koch, 1837 (India), *Arctobius* Lehtinen, 1967 (the whole of Siberia south to Mongolia), *Callobius* Chamberlin, 1947 (Far East), *Cybaeopsis* Strand, 1907 (Far East) and *Taira* Lehtinen, 1967 (Far East and South East). All genera except *Arctobius* (subfamily Arctobiinae) belong to the nominative subfamily Amaurobiinae. *Arctobius* differs distinctly from all other amaurobiids by colour, markings and eye arrangement. Amaurobiinae genera can be relatively easily distinguished by the structure of the palp in males and the epigyne in females. *Taira* has a reduced or absent retrolateral tibial apophysis (cf. Zhang et al. 2008; Wang et al. 2010). *Callobius* and *Cybaeopsis* differ from other genera by possessing a strong and long dorsal tibial

apophysis, and in having the epigyne divided into two lobes. In *Callobius* the epigyne has a median lobe which is absent in *Cybaeopsis* (Ubick 2005). *Amaurobius* has a dorsal tibial apophysis without long extensions and the epigyne is transverse and undivided.

Key to the genera of Amaurobiidae found in Asia

Females of *Amaurobius* and *Taira* have no distinct morphological differences (cf. Zhang et al. 2008)

1 Anterior median eyes equidistant from each other and anterior lateral eyes; abdomen with dark median band (*Mb*, Fig. 9), male palpal tibia without dorsal apophysis (Fig. 11), epigyne with strongly sclerotized median part of median plate (Fig. 10). Occurs in the whole of Siberia south to Mongolia.... ..... ***Arctobius agelenoides* (Emerton, 1919)**

– Anterior median eyes closer to each other than to lateral eyes; median band not developed or developed only in anterior half (Fig. 1), male palpal tibia with distinct dorsal apophysis (Figs 2, 4–8, 13, 15), epigyne bilobate (Figs 12, 14) or with weakly sclerotized median plate (Fig. 16) **2**

2 Dorsal tibial apophysis long, partly overlying cymbium (Figs 13, 15), epigyne bilobate (Figs 12, 14) **3**

– Dorsal tibial apophysis massive (Figs 2, 4–8), but not long, not overlying cymbium, epigyne with median plate, not bilobate (Fig. 16) **4**

3 Dorsal tibial apophysis with three branches (*Bd*), retrolateral tibial apophysis (*Ra*) bilobate on the top (Fig. 13), epigyne without median lobe (Fig. 12). Occurs in Far East Asia. ..... ***Cybaeopsis typicus* Strand, 1907**

– Dorsal tibial apophysis not subdivided (Fig. 15), retrolateral tibial apophysis (*Ra*) elongate dorsally; epigyne with median lobe (Fig. 14). Occurs in Far East Asia ..... ***Callobius***

4 Retrolateral tibial apophysis large (Figs 2–5, 8); tegular apophysis located near the base of median apophysis. Epigyne with transverse lobe or fovea (Fig. 16). Occurs in northern India..... ***Amaurobius***

– Retrolateral tibial apophysis small (knob-like) or absent; tegular apophysis originates near base of embolus. Occurs in Japan and China..... ***Taira***

Comments. *Cybaeopsis* Strand, 1907 is a relatively small genus with 11 species, of which only one, *C. typica* Strand, 1907, occurs in Japan and the Russian Far East (Sakhalin, South and Middle Kuril Islands (Platnick 2011). The remaining 10 species are restricted to the Nearctic. *Callobius* Chamberlin, 1947 is a rather large genus with 30 species distributed in the Western Palaearctic, Far East Asia (Japan, Korea and Kunashir Island) and the Nearctic. Only three species are known from Asia: *C. hokkaido* Leech, 1971 (Hokkaido and Kunashir Islands), *C. koreanus* (Paik, 1966) (Korea) and

C. akushimensis Okumura, 2010 (Japan) (cf. Platnick 2011; Marusik and Kovblyuk 2011). *Taira* Lehtinen, 1967 is a relatively small genus with 11 species restricted to China and Japan (Platnick 2011).

***Amaurobius koponeni* sp. n.**
urn:lsid:zoobank.org:author:36297992-069D-47FC-9B60-9B26EB2C7698
http://species-id.net/wiki/Amaurobius_koponeni
Figs 1–8

Type material. Holotype ♂ (MSNV), India, Uttar Pradesh, Farrukhabad District, Kaimganj City [=27.550°N, 79.332°E], 23.03.2003 (F. Abrescia).

Etymology. The species is named after our friend and colleague Seppo Koponen (Turku, Finland).

Diagnosis. The new species differs distinctly from other congeners by the shape of the tibial apophysis and the median apophysis.

Description. Total length 9.8. Carapace length 4.95, width 3.4. Habitus as in Fig. 1. Carapace light brown with dorsal darker radiating strips, fovea and eye region dark brown. Chelicerae dark, swollen in front with four posterior and five anterior teeth.

Legs light brownish without rings, tarsi with three claws, scopula and claws tufts absent. Calamistrum about 1/3 of metatarsus length.

Length of leg segments:

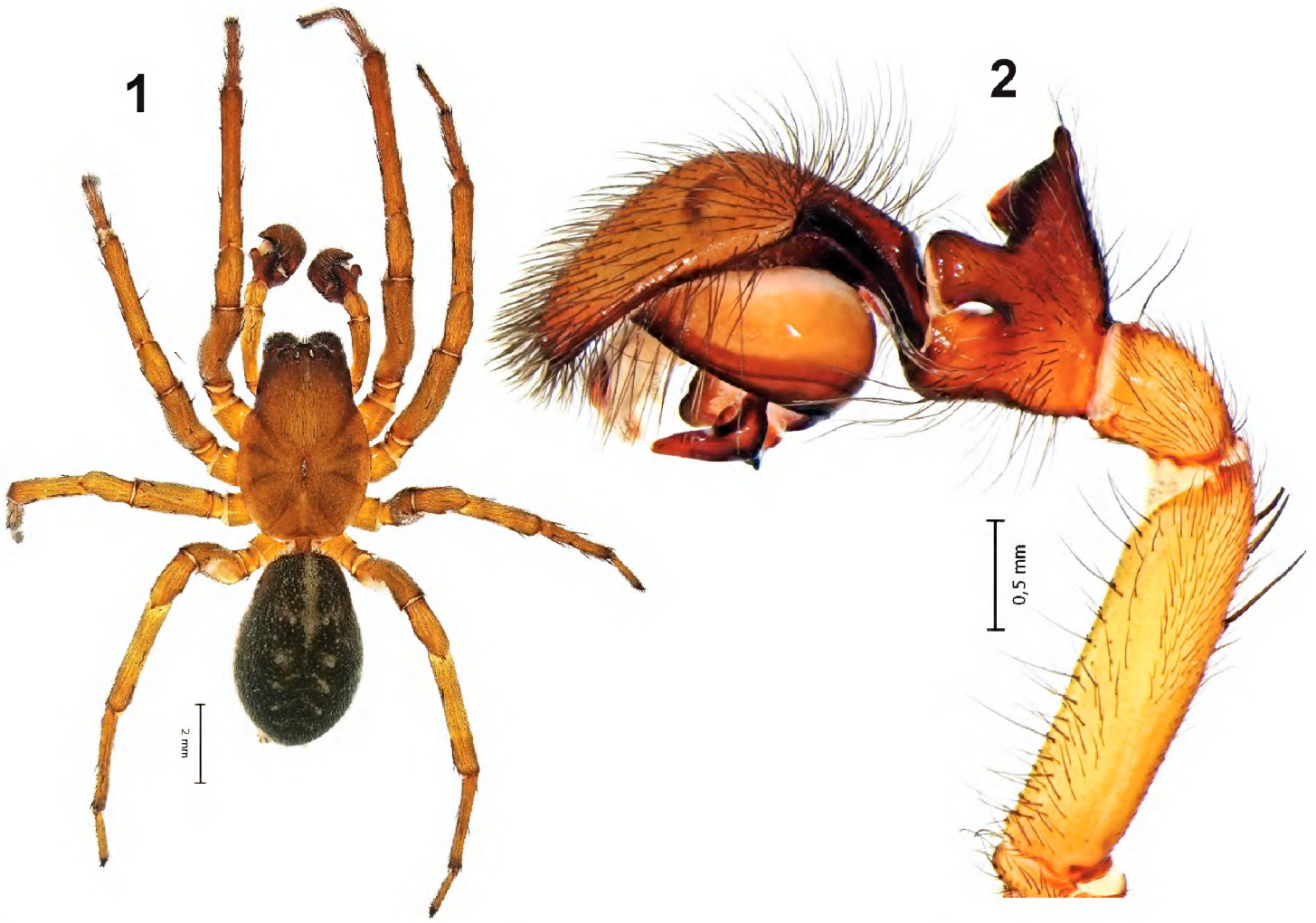
Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	4.20	1.70	4.03	4.23	1.93	16.09
II	3.60	1.68	2.83	2.93	1.50	12.54
III	3.10	1.38	2.18	2.48	1.30	10.44
IV	3.78	1.53	3.13	3.28	1.48	13.20

Leg spination:

Leg	Femur	Patella	Tibia	Metatarsus
I	d1 r1 p1	r1 p0	r2p3 v2-2-2	r3 p5 v2-2-1
II	d1 r1 p1	r1 p1	r2p3 v2-2-2	r3 p5 v2-2-1
III	d1/2 r2 p1	r1 p1	r2/3 p2 v2-2-2	d2 r5 p6 v2-2-1
IV	d1 r1 p0	r1 p0	r2 p0/1 v1-1-2	d1 r3 p4 v2-1-1

Sternum without pattern, same colour as carapace. Abdomen dark grey with dorsal and ventral pattern, cribellum clearly visible.

Palp as in Figs 2–8, tibia with large square-shaped retrolateral tibial apophysis (*Ra*) originating near the base of the tibia and almost as long as the tibia In ventral view the tibia and *Ra* have a V-shape; dorsal tibial apophysis (*Da*) large and massive, its length almost twice as long as the diameter of the tibia; intermediate apophysis not developed



Figures 1–2. Male of *Amaurobius koponeni* sp. n. **1** habitus **2** left palp, retrolateral.

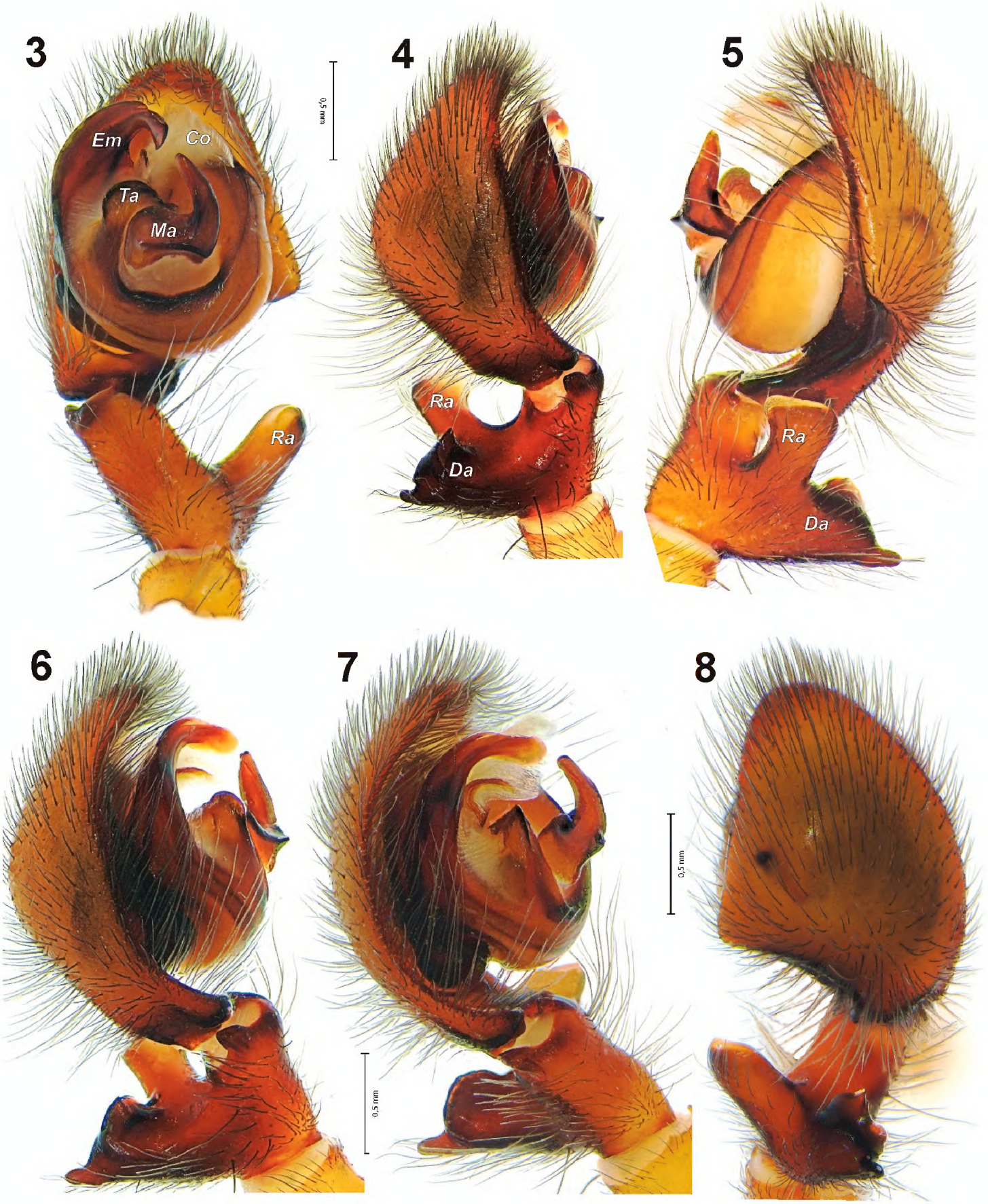
(or fused with *Da*). Retrobasal part of cymbium with long fold of about ½ of the cymbium. Median apophysis (*Ma*) massive, located in the center of the tegulum, basal half of it horizontal and terminal part almost vertical; conductor wide, as wide as basal half of *Ma*; embolus (*Em*) sharply pointed.

Distribution. The new species is known from the type locality only, the area near the city of Kaimganj in Uttar Pradesh, India.

Notes on species misplaced in *Amaurobius*

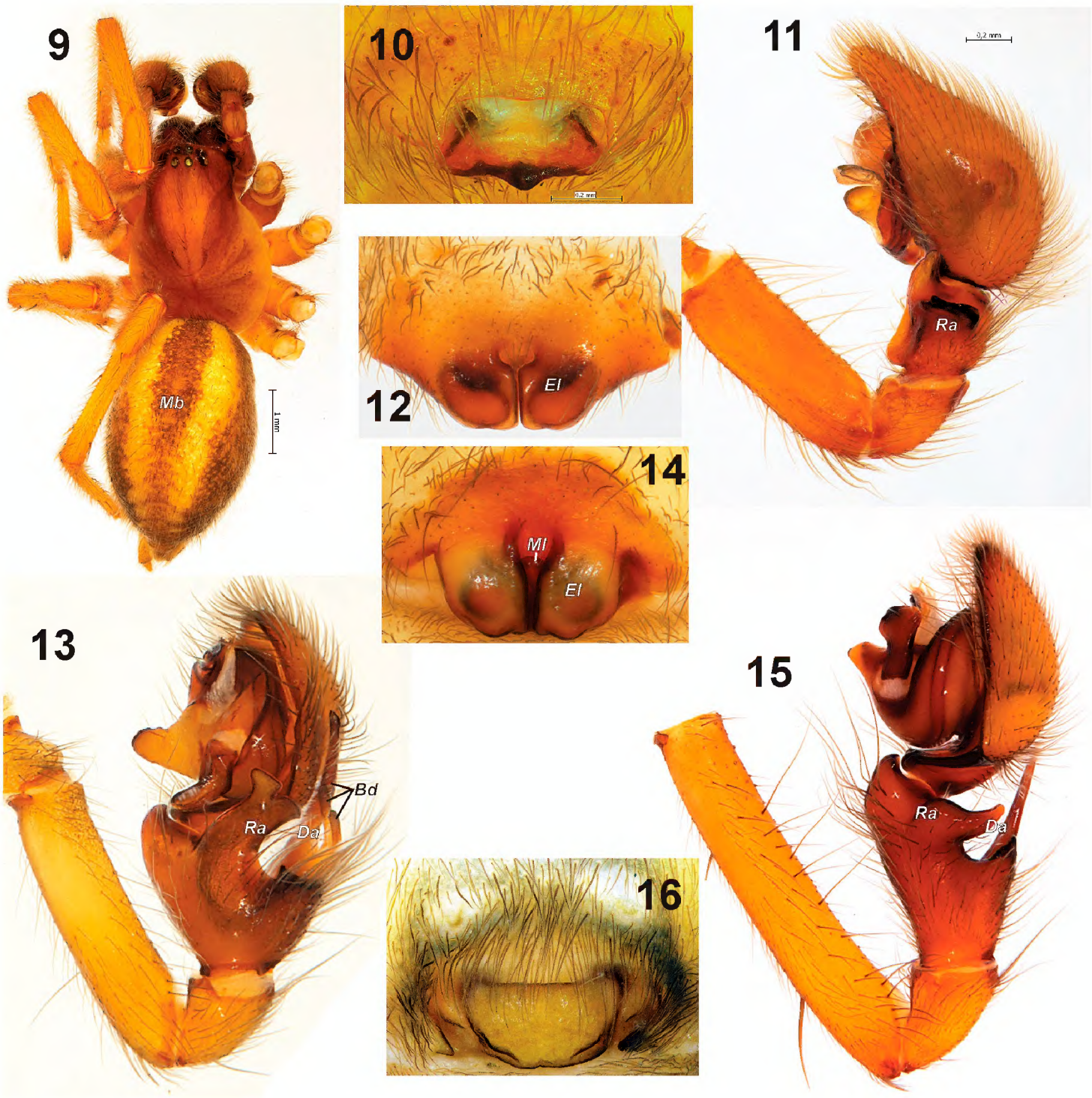
As mentioned above, three species of *Amaurobius* (*A. andhracus* Patel & Reddy, 1990, *A. nathabhaii* Patel & Patel, 1975 and *A. sharmai* Bastawade, 2008) have been recorded from India (Platnick 2011) and one more species is known from Nepal (*A. milloti* Hubert, 1973). All these species were misplaced in Amaurobiidae and actually belong in Titanoecidae. It is worth mentioning that recently one more species, *A. indicus* Bastawade, 2002 was described in the genus. Again, this was misplaced and it actually belongs in Corinnidae. It would appear that the Indian authors have an incorrect concept of the genus and of the family in general.

The genus *Pandava* was revised by Almeida-Silva et al. (2010) and five species were described as new to science. Of these, four species were described from India: *P. shiva*



Figures 3–8. Left palp of *Amaurobius koponeni* sp. n. **3** ventral **4, 6–7** prolateral, different aspects showing the shape of the complex dorsal tibial apophysis **5** prolateral **8** dorsal. Abbreviations: ***Da*** dorsal tibial apophysis, ***Em*** embolus, ***Ma*** median apophysis, ***Ra*** retrolateral tibial apophysis, ***Ta*** tegular apophysis.

Almeida-Silva et al., 2010, *P. ganga* Almeida-Silva et al., 2010, *P. kama* Almeida-Silva et al., 2010 and *P. ganesha* Almeida-Silva et al., 2010 (Fig. 17). Therefore, it is possible that some of their new names may be synonyms of Indian "*Amaurobius*".



Figures 9–16. Habitus and copulatory organs of *Arctobius agelenoides* (**9–11**, from Magadan Area), *Cybaeopsis typicus* (**12–13**, from Kunashir Island), *Callobius hokkaido* (**14–15**, from Kunashir Island) and *Amaurobius fenestralis* (**16**, from South Finland). **9** habitus **10, 12, 14, 16** epigyne, ventral **11, 13, 15** left palp retrolateral. Abbreviations: ***Bd*** branches of dorsal tibial apophysis, ***Da*** dorsal tibial apophysis, ***El*** lateral lobe of epigyne, ***Ml*** median lobe of epigyne ***Ra*** retrolateral tibial apophysis.

***Anuvinda milloti* (Hubert, 1973), comb. n.**
http://species-id.net/wiki/Anuvinda_milloti

Amaurobius milloti Hubert, 1973a: 676, f. 1-6 (♂♀).

Comments. This species is perfectly described from central and eastern Nepal (Fig. 17). Judging from the structure of the male palp, and particularly the modified patella, it undoubtedly belongs to *Anuvinda* Lehntinen, 1967, the type species of which, *A. es-*

cheri (Reimoser, 1934) was recently well redescribed on the basis of both sexes by Almeida-Silva et al. (2009). Judging from the diagnosis and figures of the copulatory organs of *A. escheri* (Reimoser, 1934), it is very likely that the two names should be synonymized. An additional argument which supports their probable synonymy is the distribution of both species. *A. escheri* is known from central India (type locality), Thailand, Laos and southern China (Yunnan) and *A. milloti* has been recorded from several localities in central and eastern Nepal.

***Pandava andhraca* (Patel & Reddy, 1990), comb. n.**
http://species-id.net/wiki/Pandava_andhraca

Amaurobius andhracus Patel & Reddy, 1990: 41, f. 1a–h (♂♀).

Comments. This species was described on the basis of both sexes from Andhra Pradesh (Fig. 17), but the description and figures are of poor quality. Judging from the figures of the male palp this species belongs in Titanoecidae. Judging from the colour, shape of the epigyne and its distribution, the species belongs to *Pandava*, a titanoecid genus restricted to India, Sri Lanka, southern China, Myanmar and Thailand. The type species of the genus has a broader distribution. Judging from the shape of the epigyne, this species may be a junior synonym of *P. laminata* (Thorell, 1878), the type species of the genus, known from East Africa to the Philippines and Marquesas Islands.

***Pandava nathabhaii* (Patel & Patel, 1975), comb. n.**
http://species-id.net/wiki/Pandava_nathabhaii

Amaurobius nathabhaii Patel & Patel, 1975: 801, f. 1a–c (♀).

Comments. This species was described on the basis of the female sex from Gujarat (Fig. 17), but the description and figures are of very poor quality. This species is placed in Titanoecidae because the other Indian species placed in *Amaurobius* belong to Titanoecidae. It is transferred to *Pandava* because of its southern distribution.

***Titanoeca sharmai* (Bastawade, 2008), comb.n.**
http://species-id.net/wiki/Titanoeca_sharmai

Amaurobius sharmai Bastawade, 2008: 40, f. 1-12 (♂♀).

Comments. This species was described from the northeastern region of Himachal Pradesh, India (Fig. 17) on the basis of both sexes, but the figures and description are of rather poorly quality. The figures provided by the author, namely the tibial and

Figure 17. Distribution of *Amaurobius koponeni* sp. n. (square), four species transferred here into Titanoecidae: *Pandava andhraca* **1** *P. nathabhaii* **2** *Titanoeca sharmai* **3** *Anuvinda milloti* **4** and four *Pandava* species recently described from India: *P. shiva* **5** *P. ganga* **6** *P. kama* **7** and *P. ganesha* **8**.

metatarsal spines on the legs in males and the structure of the palp, leaves no doubt that the species belongs in Titanoecidae. Although there are three titanoecid genera in India, judging from the locality, high elevation, and the unmodified male palpal patella, *A. sharmai* must be placed in *Titanoeca*. It is worth mentioning that this species may be a junior synonym of *T. intermedia* Caporiacco, 1934 (species incorrectly synonymized with *T. flavicoma* L. Koch, 1872), which was described from territories now belonging to northeastern Pakistan and from northern India (Jammu & Kashmir).

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